

reached finality and gives them totally false ideas as to what *we know*. It is so easy to make use of all that is good in the new work by substituting a neutral phrase, such as coefficient of activity, for coefficient of dissociation—for all that we have really done is to recognise that certain compounds exercise a superior degree of activity, and to measure the relative degree of activity of these. To substitute for common-sense expressions which all understand—and even to promulgate at County Council expense—a set of shibboleths which commit us to a definite hypothetical interpretation of the facts is unnecessary, undesirable, and unscientific. Such metaphysical speculation is obviously doing the deepest injury to the cause of exact science.

HENRY E. ARMSTRONG.

On the Publication of Original Work.

MUCH has been written and said as to the facilities for the publication of original researches in this country. It is now becoming quite a regular custom for English comparative anatomists to publish their work in a foreign journal. Not only the morphologist, but also the systematist has found this necessary. One is naturally led to inquire why—with so many learned and wealthy societies in our midst—publication cannot be effected so as to give the author the necessary printing and illustration in a style comparable with that of continental journals, and with a minimum amount of delay?

In this country the only sources of publication for monographs on zoological subjects are the *Phil. Trans.* of the Royal Society, the *Trans. Zool.*, and the *Trans. Linn.*, and of these it would naturally be supposed that the *Trans. Zool.* is pre-eminently the place for such publications. But it will scarcely be credited that a wealthy Society like this, for some unknown reason, should allow in some cases as long as two-and-a-half years to elapse before publication of material received. Thus I find, on referring to volumes of the *Trans.*, a paper received November 1, 1892, read December 20, 1892, was published in February 1895. Another, received December 5, 1892, read February 14, 1893, was published October 1895. Still another, received October 14, 1893, read November 7, 1893, was not printed till April 1896! These are examples chosen at random.

There seems no obvious reason why any or all of these should not have been published within six months from the date of reception. A fourth instance, which I here wish to narrate, will, I trust, serve the purpose of showing zoologists the need of some more speedy means of publication.

In the winter of 1894-95, I completed a piece of work on the suprarenal capsules in fishes, and was advised to offer it to the Zoological Society for publication. The paper was received, in the first instance, on June 6, and I hoped it would have been taken as read at a meeting of the Society held in that month. It was, however, not read till November 19, when Prof. Howes was good enough to undertake it for me. It was ordered for publication in the *Trans.*, and now (November 14, 1896), nearly twelve months from the date of reading, I have not yet received my proofs. Surely such extraordinary delay as this ought not to be necessary.

During such a long period I have found it necessary to keep pace with much literature bearing upon the subject; but more than this, I have just suffered the chagrin of seeing a paper embodying a large slice of my results published by an Italian journal.

Perhaps some others will be found to agree with me that some means ought to be found of getting earlier publication in comparative anatomy and allied subjects. In the minds of many, I feel sure, there can be little doubt that the Zoological Society should undertake such work.

I do not wish to make out that I have been treated exceptionally, or in any way unjustly. My experience has been no worse than that of many others. The officers of the Zoological Society have treated me with every courtesy, and have even allowed me to publish an abstract of my paper elsewhere. But, nevertheless, I fail to see why the work could not have been published within six months from the time of reception.

SWALE VINCENT.

Mason College, Birmingham, November 14.

Cultivation of Woad.

As supplementary to the article on the cultivation of woad, by Messrs. Darwin and Meldola, in *NATURE* for November 12, it may further be stated that this plant has been grown besides

at Parson Drove, at Boston, Wyberton, and Algarkirk, in the Lincolnshire Fenland, for a very long period. An account of its cultivation, with details of the process and preparing it for use, will be found in Arthur Young's "Agricultural Survey of Lincolnshire," published at the end of the last century. A more modern account will be found in "The History of the Fens of South Lincolnshire," recently published. This plant is not cultivated in any other part of England than the Fenland, and the total area grown altogether yearly does not, as a rule, exceed fifty acres. It requires very good land for its cultivation, and much rich old pasture land has been broken up for the purpose, for which as much as 10*l.* an acre has been paid for rent, and 150*l.* to 200*l.* for purchase of the freehold. The price obtained for woad was formerly about 25*l.* a ton, but it has declined in recent times to 9*l.* or 10*l.* The woad, when prepared for market, is not used for dyeing, but is mixed by woollen dyers with indigo to excite fermentation and fix the colour.

Boston.

W. H. WHEELER.

WITH reference to your article on "An English Woad Mill," may I mention that Billingsley, in his book, published in 1798, on "Agriculture in the County of Somerset," mentions woad as an important article of cultivation, raised principally in the neighbourhood of Keynsham, near Bath. The mode of preparation, described by Billingsley as in use one hundred years ago, closely resembles the description given in *NATURE* as in use at the present day. He adds that the crop is a profitable one; so lucrative, indeed, that few farmers who can raise it, ever discontinue the practice. He also mentions that it was cultivated by one Harvey, more generally known as the "Woad-man," at a farm near Mells. The cultivation of woad does not appear, therefore, to have been so very rare in the last century; but whether it is still cultivated in Somersetshire, I am unable to say.

ROSA M. BARKETT.

Kingstown, Dublin, November 14.

"X-rays with a Wimshurst Machine."

THERE is an error, for which I am responsible, in my letter of July 24 (p. 31). The words cathode and anode should be interchanged in one sentence, which should then read thus:—"The same reasoning would indicate that it would be well to make the *anode* convex towards the *cathode*, and fairly small. . . ."

Eton, November 13.

T. C. PORTER.

FLYING BULLETS.

QUITE recently M. Tissandier, editor of *La Nature*, received from Prof. Mach, formerly Professor of Physics at Prague, now Professor of the history and theory of inductive science at Vienna, a letter containing a photograph of a bullet in motion (Fig. 1). The photograph was taken by Prof. Mach's son, and shows most clearly the waves of air caused by the bullet's passage through the atmosphere.

M. Tissandier, wishing for an explanation of the experiment and description of the apparatus, wrote to Prof. Mach, and received the accompanying diagram (Fig. 2), with the following short account. "My son took the photographs of the bullet by using a spherical silvered-glass mirror. MM is the mirror, P the bullet, E the screen, B the photographic apparatus, S the spark. The bullet causes a sonorous wave, by which the Leyden jar is *mechanically* discharged, and produces the spark S."

It may be added that the description of his first apparatus appeared in *La Nature* of 1888.

Our readers are also familiar with the photographs of flying bullets which were exhibited at the soirée of the Royal Society in May 1892. These were results of experiments made by Mr. Vernon Boys, obtained by a modification of an old method. One slide showed the small pieces of paper scattered by the bullet passing through a sheet, and these were carried on in the same direction as the bullet itself; whereas in the case of a magazine rifle bullet going through a sheet of glass, the shattered pieces of glass appeared to travel in an opposite

direction to the bullet. Various kinds of bullets were used for these photographs, some of aluminium, in

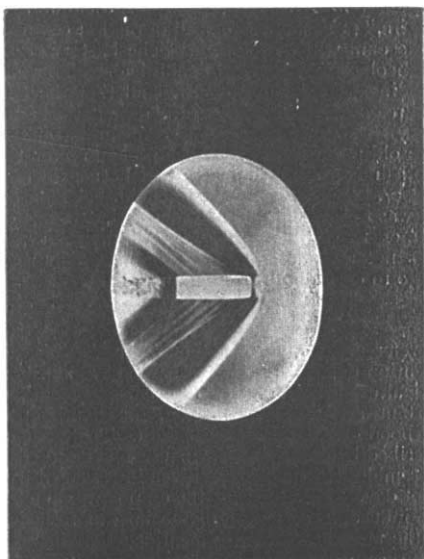


FIG. 1.—Photograph of a bullet in motion.

order to obtain a greater velocity, which varied from 750 to 3000 feet per second; the former being the

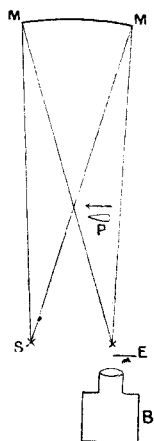


FIG. 2.—Arrangement for the photography of a bullet in motion.

average velocity of a pistol shot, the latter of a magazine rifle.

SIR B. W. RICHARDSON, F.R.S.

SIR BENJAMIN WARD RICHARDSON, whose death we regretfully announce, will be remembered more widely on account of his many lucid contributions to popular medical literature, and as an attractive lecturer on scientific subjects, than for his additions to medical knowledge. His great and versatile talents do not, however, diminish his claims to distinction as a physician of much originality of mind and a careful investigator; and these are the qualities which has earned for him the high esteem of men of science.

Sir Benjamin Richardson was born at Somerby, in the county of Leicester, in 1828, and graduated in medicine at the University of St. Andrews in 1854. After a short experience as general practitioner, he removed to London in order to devote himself to medical

and physiological research. In 1856 he obtained the Astley Cooper Triennial prize of £300 for the best essay on the coagulation of the blood, and from that time forward his life was one of incessant professional and literary activity. He devoted much time to the investigation of the action of anæsthetics, and to an endeavour to discover some agent which should be superior to chloroform; but, of the many compounds with which he experimented, only one, the bichloride of methylene, has in any way held its ground, and that only in the hands of a few administrators. This inquiry led him to the discovery in connection with which his name is best known, viz. the application of ether spray for the local abolition of pain in surgical operations. Among the many other subjects which he advanced by experimental study are: the restoration of life after various forms of apparent death; methods of killing animals without the infliction of pain; effects of electricity upon animal life; and alcohol in relation to its action on man. He also introduced into medical and surgical practice many valuable preparations, among others the ethylate of sodium; and his investigations largely contributed to the attainment of a working knowledge of the properties and uses of nitrate of amyl. In 1864, "in recognition of his various contributions to science and medicine," he was presented, by six hundred members of his profession, with a testimonial consisting of a microscope by Ross and one thousand guineas.

Sir Benjamin Richardson's contributions to magazines, journals and transactions are innumerable. He originated and for a time edited the *Journal of Public Health*, afterwards called the *Social Science Review*, and for the last twelve years he has maintained a quarterly medical journal, the *Asclepiad*, of about 150 pages, every line of which has been of his own composition. On the very day of his fatal seizure he had completed the revision of the proofs of a new book entitled "Memories and Ideals." He was elected a Fellow of the Royal Society in 1867, and was the Croonian lecturer in 1873. He received the honour of knighthood in 1893, and, among other distinctions, was a Fellow of the Society of Antiquaries, of the Royal College of Physicians of London, and of the Faculty of Physicians and Surgeons of Glasgow. He was M.A., M.D., and LL.D. of St. Andrews; Fothergillian gold medallist; and past President of the Medical Society of London.

Thus for more than forty years Sir Benjamin Richardson devoted his energies to the solution of the question, "How shall pain, disease—nay, death itself as an enemy—be swept from the earth, as vanquished enemies of every race?" By his efforts to relieve pain and remove the pangs of death, and for the attention which he gave to other questions connected with his noble profession, he claims the gratitude of humanity.

Sir Benjamin Richardson leaves a widow and two sons and a daughter.

NOTES.

A MONUMENT in memory of Father Secchi, the former Director of the Collegio Romano Observatory, has been erected at Reggio (Emilia), where he was born. The sum of 78,000 francs was publicly subscribed for this purpose.

THE *British Medical Journal* states that the long-standing question of providing a statue to Darwin in his native town (Shrewsbury) has been settled by the Shropshire Horticultural Society undertaking to defray the entire cost, estimated at from £1000 to £1200.

THE death is announced of Dr. F. Saccardo, professor of natural sciences at the school of viticulture at Avellino, a recognised authority on the diseases of the vine, and a writer on lichenology.